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# Fallopian tube block induced secondary infertility in a case of unicornuate uterus treated successfully: A long covid sequelae?

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**ABSTRACT**

Infertility arising from infections is alarming cause of secondary infertility which is growing in number by the day. Mullerian anomalies can result in female infertility. A unicornuate uterus with a rudimentary horn is an abnormality induced by a faulty mullerian duct fusion. On Hysterosalpingogram, the uterine cavity has a spindle-shaped that tapers at the tip and drains in to a single oviduct. A 30 years old female with secondary infertility post COVID 19 infection, which upon investigated turned out to be unicornuate uterus with single fallopian tube on left side cornual block visualized in fallopian tube. All the causes of fallopian tube block including pelvic inflammatory disease, tuberculosis, trauma and bacterial infections were ruled out yielding COVID19 as the probable cause of infertility. Fallopian tube cannulation was done following which she conceived spontaneously. Elective encirclage done at 12 weeks and she was asked to report at 37 completed weeks for cervical stitch removal. After that emergency LSCS done. She delivered baby boy of 2.7kg with APGAR score 9/10. We concluded that angiotensin convertase enzyme 2 receptor were present on the fallopian tube might be responsible for post COVID fallopian tube blockage which is a topic for further studies. Prompt detection and management of long COVID sequelae in the form of infertility, particularly in predisposed people who are more likely to develop such difficulties, is thus critical to preserve infertility.

**Keywords:** COVID-19, Fallopian tube block, secondary infertility, unicornuate uterus

**1. INTRODUCTION**

Mullerian abnormality is a congenital condition that occurs throughout foetal development when an embryo divides into two pairs the female reproductive system, which includes the oviducts, cervix, uterus, and the upper 2/3 of the

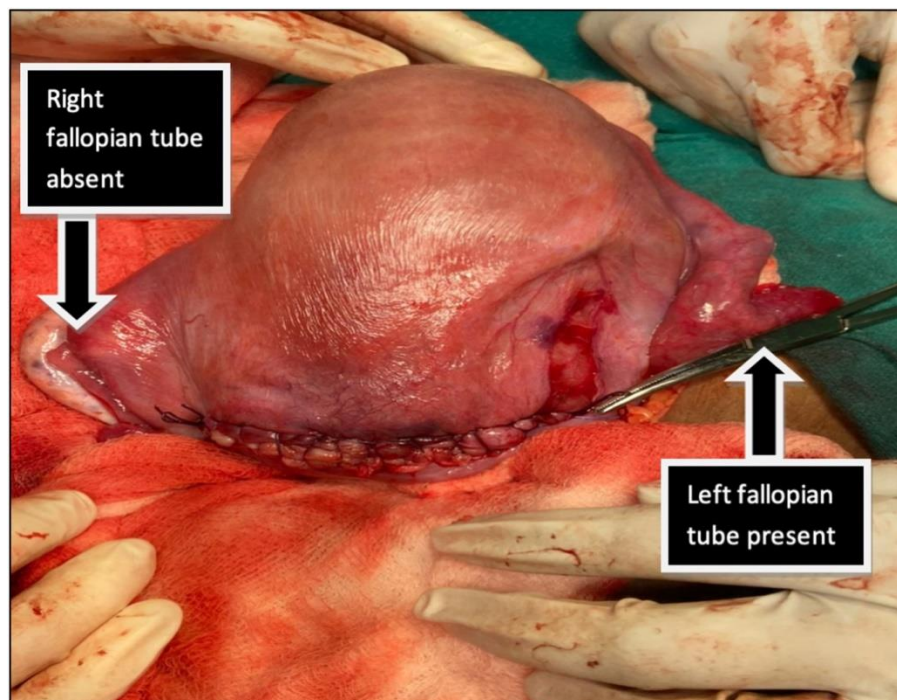
vaginal wall, is formed by Mullerian ducts (Chandler et al., 2009). A broad spectrum of abnormalities can occur when this system is disrupted. Some anomaly might be attributed to a random gene mutation and development defect. Mullerian abnormalities include the lack of a uterus, the creation of a half or double uterus, and a uterus split by a septum (Mullen & Behrenger, 2014).

COVID-19 and its varied presentations have puzzled clinicians throughout the globe. Though earlier thought to be only a respiratory illness, COVID-19 has evolved as a multisystem infection with presentations ranging from myocardial infarction (Jagtap et al., 2021), stroke, subdural haemorrhage (Tabikhooei et al., 2021) to intrauterine death and infertility (Madaan et al., 2021). COVID-19 has laid its impact on fertility in reproductive age men and women. ACE2 receptors are expressed in ovaries, uterus and vagina, and in seminiferous ductal cells of males too. Eventually virus targets and binds to ACE 2 receptor, thus leading to major pathogenesis in reproductive system.

## 2. CASE PRESENTATION

30 years old female with 6 years of married life, with 1 previous pre term delivery 2 years ago reported to Acharya Vinoba B have rural hospital, India in gynaecology outpatient department as she was unable to conceive since 1 year. She gave a history of COVID 19 infection 18 months back when her hrct score was 11/25 and she was being treated with remdesivir and steroids. The patient did not come for any follow up post her discharge from the hospital. All investigations including complete blood count, thyroid function test, luteinizing hormone and follicle stimulating hormone levels were within normal limit.

The patient had a unicornuate uterus with a single fallopian tube, which was found three years ago after MRI was performed based on her history of two previous abortions. In the past, there had been no TB or chronic sickness. Diagnostic Hystero-Laparoscopy was performed suggestive of unicornuate uterus with a single fallopian tube on the left side with cornual block, right side fallopian tube was not visualized, and Successful fallopian tube cannulation was done using selective Fallopian Tube Recanalization guide wire. Ultrasonography of the whole abdomen and pelvis was done suggestive of right renal agenesis. Other reasons of tubal block were ruled out after TB PCR, CBNAAT (Cartridge Based Nucleic Acid Amplification Test) done on endometrial aspirate, and peritoneal washing all came out negative. Husband semen analysis was also within normal limit. Hence, a diagnosis of COVID 19 induced fallopian tube was made.



**Figure 1** Intraoperative picture of unicornuate uterus

On discharge, folic acid and empirical treatment of doxycycline with metronidazole prescribed for 14 days. Six months post hysteroscopy patient reported in hospital with complaint of missed period. Urine pregnancy test was positive suggestive of spontaneous conception. Elective encirclage were done at 12 weeks (after normal Nuchal Translucency scan) by Mac Donald

encirclage method. Her antenatal visits were unremarkable and she was asked to report at 37 completed weeks for cervical stitch removal. After removal of stitches patient went into spontaneous labor.

Emergency Caesarean section done in view of non-reassuring Nonstress Test. Male baby of 2.7 kg delivered with APGAR score 9/10. Intraoperatively there was double loop of cord around neck with uterine anomaly ESHRE U 4 B. The right sided fallopian tube being absorbed completely in the broad ligament, only fimbrial end was seen as shown in figure 1. Left sided fallopian tube appears normal, bilateral ovaries appear normal. The patient was discharged in good health after receiving contraception guidance.

### 3. DISCUSSION

We have discussed a case of predisposed patient who already had a unilateral fallopian tube with a unicornuate uterus who developed secondary infertility in the post COVID period. Upon investigation, the patient had blocked fallopian tube which was treated with recanalization during diagnostic hysterolaparoscopic procedure hence successfully leading to spontaneous conception. The differential diagnosis for tubal blockage includes pelvic inflammatory disease, tuberculosis (Parikh et al., 1997), endosalpingeal trauma, tubal endometriosis (Goldberg et al., 2019), tubal polyp, mucus debris and tubal spasm. As there was no free fluid in the pouch of Douglas on ultrasonography, and no history of white coloured vaginal discharge or abdominal discomfort, the diagnosis of pelvic inflammatory disease was ruled out.

Genital tuberculosis was ruled out as the patient tested negative for tuberculosis through TB PCR and CBNAAT done on peritoneal washing and endometrial aspirate. There had been no previous incidents of chronic pain in the abdomen which is characteristically present in endometriosis and starting before the initiation of menses. There was no evidence of endometriosis, mucus debris, tubal spasm or polyp on hysterolaparoscopy thereby ruling these out as a potential tubal occlusion causes. COVID-19 induced infertility has been a source of worry ever since its emergence in 2019. While COVID -19 induced fertility has been reported before due to gonadal axis dysfunction and ovarian failure (Wilkins et al., 2021) there is limited data to justify any fallopian tube related pathology as a consequence of SARS –CoV2 infection.

The virus binds to the ACE 2 receptor and modulates its expression (Beyerstedt et al., 2021). Apart from lungs, ACE 2 receptors have been demonstrated in atypical locations such as the cardiovascular system, central nervous system, renal as well as reproductive system (Salamanna et al., 2020). The presence of ACE 2 receptors in the ovary, uterus, and fallopian tube may thus be a cause of infertility in the post-COVID phase (Madjunkov et al., 2020). Another aspect is the existence of Neuropilin-1 in the fallopian tubes which has been demonstrated in high concentration in the cilia of fallopian tube cells (Wild et al., 2012); COVID-19 virus entry is facilitated through this protein neuropilin-1. In the above scenario it is plausible to believe that COVID-19 may lead to inflammatory effects on the reproductive system including the fallopian tubes which can ultimately lead to infertility which is being reported as a post COVID sequela.

However further studies are indeed required to establish this association. There have been various reports of atypical presentations due to Long COVID syndrome including opportunistic infections like pulmonary mucormycosis (Talwar et al., 2021) and rhino-orbital mucormycosis (Shah et al., 2021) along with other presentations with paramount importance in obstetrics and gynecology like post-partum depression (Talwar et al., 2021) and HELLP syndrome (Madaan et al., 2022). However, this is the first case report to link fallopian tube block with Long COVID syndrome.

### 4. CONCLUSION

One of the major causes of secondary infertility in such patient infected with COVID-19 could be fallopian tube block. The development of issues such as a protracted COVID sequence should be closely monitored by treating professionals, especially in susceptible people with pre-existing uterine abnormalities as unicornuate uterus in our case. A routine follow-up of such patients especially in the rural care centers based on grass route levels can help in early diagnosis and intervention leading to preservation of fertility. More research is needed to study the spectrum of reproductive system involvement in COVID-19 and to ascertain between COVID-19 and fallopian tube blockage.

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#### Author Contributions

All authors have contributed equally.

# Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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# Conflicts of interest

The authors declare that there are no conflicts of interests.

# Data and materials availability

All data associated with this study are present in the paper.

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